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HOUSE ARMED SERVICES COMMITTEE

**STATEMENT OF**  
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**BEFORE THE**  
**HOUSE ARMED SERVICES COMMITTEE**  
**SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES**  
**HEARING ON**  
**FUTURE REQUIREMENTS AND CAPABILITIES OF**  
**U.S. MARITIME FORCES**  
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Chairman Taylor, Ranking Member Akin, distinguished members of the subcommittee, thank you for the opportunity to appear before you today to discuss the future Navy. The upcoming Quadrennial Defense Review (QDR), press reports about potential reductions in defense acquisition programs, and recent proposals from think tanks for the future size and structure of the Navy all make this a timely hearing.

An in-depth discussion of all issues relating to the future Navy would make for a very lengthy document. Rather than attempting such a comprehensive discussion, this statement focuses on certain aspects of the topic that may be of particular interest to the subcommittee. The statement is organized into the following sections:

- initial observations that can be made about the future Navy, given today's Navy, recent shipbuilding rates, and current technical trends in Navy acquisition (pages 1-4);
- a summary of recent think tank proposals for future Navy ship force structure (pages 4-6);
- a discussion of how the future mix of Navy platforms and capabilities can depend in part on choices by policymakers regarding the missions to be performed by the future Navy (pages 7-11);
- some additional planning considerations regarding the future Navy (pages 12-15); and
- some specific shipbuilding issues relating to the future Navy (pages 16-24).

## Initial Observations

### Part of the Future Navy Already Exists

An initial point to bear in mind is that a significant part of the Navy that will exist 10 to 20 years from now is already here in the form of ships and aircraft currently in service or under construction. Given the long service lives of Navy ships, a substantial fraction of ships currently in service, plus all those currently under construction, will likely be in service a decade or two from now.<sup>1</sup> Although aircraft service lives are generally shorter than ship service lives, many aircraft currently in service, plus most of those currently under construction, will likely be in service 10 or more years from now.

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<sup>1</sup>As a notional rule of thumb, assuming an average ship service life of 35 years, roughly two-thirds of ships currently in service might still be in service about 12 years from now, and roughly one-third of ships currently in service might still be in service about 24 years from now. As a practical matter, these fractions can be affected by an uneven age distribution of ships currently in service, and can turn out to be lower if ships are removed from service prior to the ends of their service lives as a cost-saving measure or as part of an effort to restructure the Navy.

## Shipbuilding Rate Needed For 313-Ship Fleet

A second initial observation is that because relatively low annual numbers of Navy ships have been procured for the last 17 years, increased annual numbers of the ships would need to be procured in coming years to achieve and maintain the Navy's desired 313-ship fleet.

As shown in **Table 1**, the Navy has procured 92 battle force ships since FY1993, or an average of about 5.4 ships per year for the last 17 years.<sup>2</sup> This is about 60% of the steady-state replacement rate for a 313-ship fleet, which is about 8.9 ships per year (assuming an average ship service life of 35 years). An average rate of 5.4 ships per year, if sustained over a 35-year period, would eventually result in a fleet of about 190 ships.

**Table 1. Battle Force Ships Procured, FY1982-FY2009**

82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
17	14	16	19	20	17	15	19	15	11	11	7	4	4	5
97	98	99	00	01	02	03	04	05	06	07	08	09	93-09 avg.	
4	5	5	6	6	6	5	7	8	4 <sup>a</sup>	5 <sup>a</sup>	3 <sup>a</sup>	8	5.4	

**Source:** CRS compilation based on examination of defense authorization and appropriation committee and conference reports for each fiscal year. The table excludes non-battle force ships that do not count toward the 313-ship goal, such as certain sealift and prepositioning ships operated by the Military Sealift Command (MSC) and oceanographic ships operated by agencies such as the National Oceanic and Atmospheric Administration (NOAA).

a. The totals shown for FY2006, FY2007, and FY2008, reflect the cancellation of two of three LCSs funded in FY2006, the two LCSs funded in FY2007, and the single LCS funded in FY2008.

Procuring a total of 313 ships over a 35-year period starting in FY1993 would now require procuring 221 ships over the next 18 years (FY2010-FY2027), or an average of about 12.2 ships per year. The financial challenge of procuring an average of 12.2 ships per year for the next 18 years would be only partially mitigated by the recent addition of the relatively inexpensive Littoral Combat Ship (LCS) to the shipbuilding mix, because 9.4 of the 12.2 ships per year would need to be ships other than LCSs.<sup>3</sup>

<sup>2</sup>Battle force ships are the ones that count against the 313-ship goal. The FY1993 defense budget was the first defense budget passed by Congress and signed into law following the dissolution of the Soviet Union in December 1991, and thus arguably the first passed and signed into law in a fully or unambiguously post-Cold War security environment.

<sup>3</sup>Four LCSs have been procured and not subsequently cancelled through FY2009, leaving another 51 to be procured in coming years to reach the planned total of 55. Subtracting these 51 LCSs leaves 170 ships other than LCSs that would need to be procured over the next 18 years, or an average of about 9.4 per year. Calculations based on steady-state replacement rates do not provide precise figures for the numbers of ships of specific kinds that would need to be procured in coming years to achieve and maintain the Navy's planned 313-ship fleet due to the uneven age distribution of existing ships and differences between ship classes in service lives. For example, since aircraft carriers have 50-year service lives, not all 11 of the Navy's carriers would need to be replaced in a given 35-year period. Calculations based on steady-state replacement rates (continued...)

The Navy hopes to procure ships at higher annual rates in coming years. Such rates are reflected in the FY2009 version of the Navy's 30-year shipbuilding plan. The Navy, however, does not appear to have a clearly identifiable strategy for generating the amount of shipbuilding funding that would be needed to fully execute the FY2009 30-year shipbuilding plan, at least not without substantially increasing the Navy's budget top line or substantially reducing funding for other Navy programs. The amount of shipbuilding funding that would be needed to fully execute the FY2009 30-year shipbuilding plan — an average of about \$23 billion to \$25 billion per year in constant FY2009 dollars — is roughly twice the average of about \$11 billion per year in constant FY2009 dollars that the Navy has requested (and Congress, with some adjustments, has provided) in recent years.<sup>4</sup>

A February press report suggests that the Navy may seek to reduce the cost of the FY2010 version of the 30-year shipbuilding plan by reducing planned procurements of certain higher-cost ships. According to the report, proposals being considered by the Navy include the following:

- shifting planned procurement of CVNs from one approximately every 4.5 years to one every five years;
- reducing planned procurement of attack submarines (SSNs) over 30 years from 53 boats to 40 boats, a reduction of about 25%;
- reducing planned procurement of CG(X) cruisers from 19 (procured at a rate of one or two per year) to eight (procured at a rate of one every three years), a reduction of about 58%;
- reducing planned procurement of destroyers over 30 years from 50 ships to 34, a reduction of 32%; and
- eliminating the three modified large-deck amphibious assault ships (LHAs/LHDs) from the planned Maritime Prepositioning Force of the Future (MPF(F)) squadron.

This press report also suggests that the Navy is considering more than doubling planned procurement of relatively inexpensive Joint High Speed Vessels (JHSVs), from 14 over 30 years to 29, and increasing annual procurement rates of the LCS while maintaining a planned total of 55 LCSs.<sup>5</sup>

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<sup>3</sup>(...continued)

can, however, provide a general indication of the average overall shipbuilding rate that would be needed in coming years to achieve and maintain a Navy of a given size.

<sup>4</sup>See Congressional Budget Office, *Resource Implications of the Navy's Fiscal Year 2009 Shipbuilding Plan*, Washington, 2008. (June 9, 2008) p. 14 (Table 3), which is also reprinted as Table 7 in CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>5</sup>Christopher P. Cavas, "U.S. May Cut 52 Ships From Plan," *Defense News*, February 16, 2009, p. 1.

If the FY2010 30-year shipbuilding plan includes changes such as these, the result could be a future Navy that increases for a time to more than 313 ships as significant numbers of JHSVs and LCSs enter service in the nearer term, but which subsequently falls to something less than 300 ships as deliveries of JHSVs and LCSs end and existing higher-cost ships continue to retire and are replaced on something less than a one-for-one basis.

## Technical Trends in Navy Acquisition

A third initial observation, based on technical trends in Navy acquisition, is that the future Navy will likely be characterized by most or all of the following:

- an increasing use of unmanned vehicles, networking capabilities, and open-architecture computers and software;
- an increasing number of ships with
  - reduced crew sizes;
  - integrated electric drive technology;
  - common ship hull designs, combat systems, and components, so as to recover lost economies of scale in shipbuilding and reduce ship life-cycle operating and support (O&S) costs; and
  - significant modularity (sometimes called physical open architecture, as opposed to software open architecture), so as to reduce costs associated with upgrading or changing their mission systems over their life cycles;
- a continued reduction in the number of aircraft types, models, and series, so as to improve aircraft production economies of scale and reduce aircraft life-cycle operation and support (O&S) costs; and
- new types of weapons, such as directed-energy weapons or high-speed missiles.

## Recent Think Tank Proposals

At least three Washington-area think tanks — the Center for a New American Security (CNAS),<sup>6</sup> the Center for Strategic and Budgetary Assessments (CSBA),<sup>7</sup> and the Heritage Foundation<sup>8</sup> — have recently published proposals for future Navy ship force structure. These proposals, along with the Navy's planned 313-ship fleet, are summarized in **Table 2**.

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<sup>6</sup>Frank Hoffman, *From Preponderance to Partnership: American Maritime Power in the 21st Century*. Washington, Center for a New American Security, November 2008. 27 pp.

<sup>7</sup>Robert O. Work, *The US Navy[:] Charting a Course for Tomorrow's Fleet*. Washington, Center for Strategic and Budgetary Assessments, 2008. 90 pp.

<sup>8</sup>Baker Spring and Mackenzie M. Eaglen, *Quadrennial Defense Review: Building Blocks for National Defense*. Washington, Heritage Foundation, January 28, 2009. (Backgrounder, revised and updated February 9, 2009) 17 pp.

**Table 2. Navy's 313-Ship Plan and Recent Think Tank Proposals**

Ship type	Navy 313-ship plan	Think Tank Proposals		
		CNAS	CSBA <sup>a</sup>	Heritage
Submarines				
SSBN	14 (12) <sup>b</sup>	14	12	n/a
SSGN	4	0	2	n/a
SSN	48	40	41	at least 60
Aircraft carriers				
CVN	11	8	11	13
CVE	0	0	4	n/a
Surface combatants				
CG	19	18	14	100
DDG	69	56	73	
Frigates	0	0	9 <sup>c</sup>	n/a
LCS	55	48	55	20
SSC	0	40	0 <sup>d</sup>	n/a
Amphibious and MPF(F) ships				
Amphibious ships	31	36	33	n/a
MPF(F) ships	12	0	3 <sup>e</sup>	n/a
LSD station ships	0	0	7 <sup>f</sup>	n/a
CLF and support ships				
CLF	30	40	31	n/a
Support	20		31	n/a
TOTAL	313	300	326 <sup>g</sup>	n/a

**Sources:** Table prepared by CRS using U.S. Navy data for the 313-ship fleet and information in Frank Hoffman, *From Preponderance to Partnership: American Maritime Power in the 21st Century*. Washington, Center for a New American Security, November 2008. p. 19 (Table 2); Robert O. Work, *The US Navy[.] Charting a Course for Tomorrow's Fleet*. Washington, Center for Strategic and Budgetary Assessments, 2008. p. 81 (Figure 5); and Baker Spring and Mackenzie M. Eaglen, *Quadrennial Defense Review: Building Blocks for National Defense*. Washington, Heritage Foundation, January 28, 2009. (Backgrounder, revised and updated February 9, 2009) p. 15.

Notes: **n/a** = not addressed in the report; **SSBN** = nuclear-powered ballistic missile submarine; **SSGN** = nuclear-powered cruise missile/special operations forces submarine; **SSN** = nuclear-powered attack submarine; **CVN** = large nuclear-powered aircraft carrier; **CVE** = medium sized aircraft carrier; **CG** = cruiser; **DDG** = destroyer; **LCS** = Littoral Combat Ship; **SSC** (an acronym created by CRS for this table) = small surface combatant of 1,000+ tons displacement — a ship similar to late-1990s Streetfighter concept; **MPF(F)** = Maritime Prepositioning Force (Future); **LSD** = LSD-41/49 class ship operating as a station ship for a formation like a Global Fleet Station (GFS); **CLF** = combat logistics force (i.e., at-sea resupply) ship.

- a. Figures shown are for the year 2028.
- b. Navy plans show the current 14-ship SSBN requirement changing to a requirement for 12 next-generation SSBNs due to the next-generation boats being built with life-of-the-ship nuclear fuel cores.
- c. Maritime Security Frigates.
- d. Plan includes 28 patrol craft (PCs) of a few hundreds tons displacement each, as well as 29 boat detachments and seven riverine squadrons.

- e. Plan shows three Mobile Landing Platform (MLP) ships that the Navy currently plans for the MPF(F) squadron, plus 16 existing current-generation maritime prepositioning force (MPF) ships and 17 existing prepositioning ships for Army and other service/agency equipment. Plan also shows 67 other DOD sealift ships.
- f. T-LSDs, meaning LSDs operated by the Military Sealift Command (MSC) with a partly civilian crew.
- g. The CSBA report shows a total of 488 units by including 162 additional force units that do not count toward the 313-ship goal under the battle force ships counting method that has been used since the early 1980s for public policy discussions of the size of the Navy. These 162 additional force units include 16 existing current-generation maritime prepositioning force (MPF) ships and 17 existing prepositioning ships for Army and other service/agency equipment, 67 other DOD sealift ships, 28 PCs, 29 boat detachments, and certain other small-scale units. The CSBA report proposes a new counting method for naval/maritime forces that includes units such as these in the total count.

As can be seen in **Table 2**, the three think tank proposals differ in several respects from the Navy's 313-ship plan, and from one another. Points of comparison include the following:

- Compared to the 313-ship plan, the CNAS proposal would reduce the planned numbers of attack submarines (SSNs), nuclear-powered aircraft carriers (CVNs), cruisers (CGs), destroyers (DDGs), and LCSs, increase the planned number of amphibious ships, and build 40 small surface combatants displacing about 1,000 tons — ships similar to the late-1990s Streetfighter proposal.
- Compared to the 313-ship plan, the CSBA proposal would, among other things, add four medium-sized aircraft carriers (CVEs), nine “maritime security frigates,” and seven “station ships” based on existing LD-41/49 class amphibious ships.
- Compared to the 313-ship plan, the Heritage Foundation proposal would increase planned numbers of SSNs, CVNs, and CGs/DDGs, while reducing planned numbers of LCSs.
- Compared to one another, the CNAS proposal would reduce planned numbers of large, high-capability combatant ships and increase planned total numbers of smaller combatants, while the Heritage Foundation proposal would do the opposite.
- The CSBA proposal is in between the CNAS and Heritage Foundation proposals in certain areas, and contains a number of specific proposals that do not appear in the CNAS and Heritage Foundation proposals. The CSBA proposal employs a proposed new vocabulary for referring to different parts of the Navy, and a proposed new set of rules for which ships and other units to include in counting the numbers of ships and other units that contribute to U.S. naval/maritime capability.



# Potential Future Mission Priorities

The divergence in the recommendations of the three think tanks appears to reflect differing views regarding missions the Navy should focus on performing in coming years. In this sense, the think tank proposals illustrate how the Navy can be viewed as being at a fork in the road regarding future mission priorities, and how differing choices on mission priorities can produce different versions of the future Navy.

It has sometimes been said in recent years that the Navy since the end of the Cold War has been casting about in search of missions to perform, and that finding such missions has been difficult. It might be more accurate to say that there are several candidate missions for the Navy to perform (some of which have emerged or become potentially more important at various points since the end of the Cold War), and that the challenge is deciding which of these candidate missions to pursue, and with how much relative emphasis. As candidate missions have emerged or become potentially more important since the end of the Cold War, Navy thinking on mission priorities has evolved, leading to shifts in Navy plans and programs in recent years.

Potential missions for the future Navy can be listed and organized in various ways. There are many such organizational schemes; each has its advantages, and none is perfect. For the purposes of this statement, it can be argued that the composition of the future Navy may be influenced by decisions that policymakers reach on how much emphasis to place on Navy capabilities for conducting each of the following four general categories of operations:

- **First category:** Non-combat operations and operations with a potential for lower-levels of combat. This category includes engagement and partnership-building operations, humanitarian assistance and disaster relief (HA/DR) operations, non-combatant evacuation operations (NEOs), anti-piracy operations, and other maritime-security operations.
- **Second category:** Counter-terrorist (CT) and irregular warfare (IW) operations.
- **Third category:** Operations for deterring and participating in larger-scale conventional conflicts on the continental land mass.
- **Fourth category:** Operations for countering improved Chinese naval and other maritime-relevant military forces.<sup>9</sup>

In planning the future Navy, policymakers may choose to emphasize any or all of the above categories. The choices policymakers make should, in theory at least, reflect larger choices about U.S. national security strategy, about the role of the military in fulfilling that strategy, and about the role of the Navy in fulfilling the military portion of that strategy. In a situation of constrained resources, placing a greater emphasis on any one category could require a reduced emphasis on one or more of the others. Each of these four categories of operations is discussed below.

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<sup>9</sup>The labels “First category,” “Second category,” and so on are simply for use in referring to these categories in the remainder of this statement, and do not imply any order of priority.

## Non-Combat and Potentially Lower-Level Combat Operations

The first category of operations listed above has been increasingly emphasized in Navy statements and operations over the last few years. Placing a strong planning emphasis on these operations could lead to a future Navy with significant numbers of smaller surface combatants (frigates, LCSs, corvettes, and patrol craft<sup>10</sup>), amphibious ships, JHSVs, sealift ships with logistics-over-the-shore capabilities, and hospital ships. There could also be significant numbers of Navy foreign area officers (FAOs), civil affairs units, and construction battalions (CBs, aka Seabees).

Amphibious ships, including their embarked Marines, helicopters, and landing craft, could be used for conducting every type of operation in this category. Smaller surface combatants would be particularly useful for engagement and partnership-building operations, anti-piracy operations, and other maritime-security operations. They could be optimized for anti-piracy and other maritime-security operations by being equipped with helicopters, UAVs, small boats, smaller-caliber guns, additional systems for defense against lightly armed opponents, and reasonably good C4ISR capabilities.

Cruisers and destroyers could be used for engagement and partnership-building operations, anti-piracy operations, and other maritime-security operations, and to provide area-defense capabilities for smaller surface combatants, amphibious ships, JHSVs, sealift ships, and hospital ships. Aircraft carriers could be used for operations in this category, and their embarked helicopters could be particularly useful in HA/DR operations, NEOs, and maritime-security operations.

In considering how much emphasis to place on this first category of operations, one factor that policymakers may consider is the potential for some of these operations to be conducted by the U.S. Coast Guard or by foreign navies and coast guards. U.S. Coast Guard cutters can be used for engagement and partnership-building operations, anti-piracy operations, and other maritime-security operations. Numerous foreign navies and coast guards have at least some capability for conducting anti-piracy and other maritime security operations, particularly in their home waters. (Many foreign navies and coast guards consist largely of smaller surface combatants.) In instances where foreign navies or coast guards are able and willing to conduct some of these missions, U.S. policymakers might still prefer to have them conducted by U.S. Navy (or U.S. Coast Guard) ships, so that the United States receives the political credit for conducting them.

Since U.S. Coast Guard cutters could perform some of these missions, decisions about future Coast Guard missions and ship force structure might affect decisions about future U.S. Navy missions and ship force structure, and vice versa. Maintaining some ambiguity about the dividing line between Navy and Coast Guard responsibilities for performing these missions can provide policymakers with useful flexibility in determining how to respond to contingencies. This ambiguity might also lead to some redundancy between in Navy and Coast Guard capabilities for performing these missions. Optimizing investments in U.S. maritime power from a national (as opposed to service-specific) perspective — a goal consistent with the Navy-Coast

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<sup>10</sup>Corvettes are light frigates. The LCS can be viewed as a high-speed, shallow-draft frigate or corvette.

Guard National Fleet policy statement of 2006<sup>11</sup> — might involve reducing unwanted redundancy between the services for performing these missions. This in turn might require making the dividing line between the two services for performing these missions less ambiguous.

## Counter-Terrorist (CT) and Irregular Warfare (IW) Operations

Counter-terrorist operations have been an area of emphasis for the U.S. Navy forces since the terrorist attack on the Cole (DDG-67) of October 12, 2000, and the terrorist attacks of September 11, 2001. Irregular warfare has been an area of emphasis for U.S. military forces in recent years due to U.S. military operations in Iraq and Afghanistan. Press reports suggest that the upcoming QDR may shift U.S. defense planning toward an increased emphasis on irregular warfare.

Placing a strong planning emphasis on CT and IW operations could lead to a future Navy with significant numbers of Navy special operations forces (i.e., SEALs<sup>12</sup>); Advanced SEAL Delivery Systems (ASDSs); ship-based manned aircraft and unmanned air vehicles (UAVs)/unmanned combat air vehicles (UCAVs)<sup>13</sup> that are capable of surveillance, close air support (CAS), and precision-strike operations; mine countermeasures (MCM) platforms (i.e., LCSs equipped with mine warfare mission packages, and MCM helicopters); patrol craft; and riverine squadrons. As with the first category of operations, there could be significant numbers of Navy FAOs, civil affairs units, and CBs.

Surface ships and submarines could be used for surveillance of terrorists. Submarines in particular could be used for covert surveillance and covert insertion and recovery of SEALs using ASDSs. Tomahawk-armed cruisers, destroyers, and submarines could conduct cruise missile strikes against terrorists and their facilities. Amphibious ships could be used to land Marines for conducting CT and IW operations in littoral areas. Aircraft carriers could embark larger numbers of manned aircraft and UAVs/UCAVs that are capable of surveillance, CAS, and precision-strike operations.

## Larger-Scale Conventional Conflicts on Continental Land Mass

Being prepared to conduct larger-scale conventional conflicts on the continental land mass was a primary force-planning metric for the military services for much of the 1990s, and continued to be a planning metric for a few years into this decade. During much of this period, a central planning requirement for the U.S. military was to be capable of winning two nearly-simultaneous or overlapping major regional conflicts. Potential locations for these conflicts included the Korean Peninsula and Southwest Asia.

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<sup>11</sup>Department of the Navy and United States Coast Guard, *National Fleet, A Joint Navy/Coast Guard Policy Statement*. March 3, 2006. 3 pp.

<sup>12</sup>SEAL stands for SEa, Air, and Land.

<sup>13</sup>UCAVs are armed UAVs.

Today's Navy is to some degree a product of this 1990s/early 2000s planning emphasis. Among other things, this emphasis led to new Navy programs for providing capabilities for operating in contested littoral waters and for attacking targets ashore. The LCS program and the DD-21/DD(X)/DDG-1000 program are examples of such programs.

Placing a strong planning emphasis on deterring and participating in larger-scale conventional conflicts on the continental land mass could lead to a future Navy with significant numbers of aircraft carriers, cruisers and destroyers, LCSs, MCM helicopters, amphibious ships, and maritime prepositioning ships. Carrier air wings would include, among other things, significant strike and CAS capabilities. Cruisers and destroyers would have substantial capabilities for conducting antisubmarine warfare (ASW), anti-air warfare (AAW), ballistic missile defense (BMD), strike, and fire-support operations, particularly in littoral waters. Attack submarines would be used for pre-conflict intelligence and surveillance operations, inserting SEALs, conducting Tomahawk strike operations, and countering enemy surface ships and submarines.

In considering how much emphasis to place on this category of operations, policymakers may consider the likelihood in coming years of larger-scale conventional conflicts on the continental land mass — in the Korean Peninsula, Southwest Asia, or other areas — and the likelihood that the United States might participate in such conflicts.

## Countering Chinese Naval and Other Maritime-Relevant Forces

China has been modernizing its naval and other maritime-relevant military forces<sup>14</sup> since the 1990s. Observers believe a near-term focus of China's military modernization effort is to field a force that can succeed in a short-duration conflict with Taiwan and act as an anti-access force to deter U.S. intervention or delay the arrival and reduce the effectiveness of intervening U.S. naval and air forces. Potential broader or longer-term goals of China's naval modernization include asserting China's regional military leadership and asserting and protecting China's maritime territorial, economic, and energy interests. A CRS report explores in some detail the potential implications for required U.S. Navy capabilities of improved Chinese naval and other maritime-relevant military forces.<sup>15</sup>

Placing a strong planning emphasis on operations for countering improved Chinese naval and other maritime-relevant military forces could lead to a future Navy with significant numbers of aircraft carriers, attack submarines, cruisers and destroyers, and additional surface and air ASW and MCM platforms, such as LCSs and maritime patrol aircraft. Carrier air wings would include, among other things, a strong capability for fleet air defense. They might also include aircraft with particularly long ranges, so that carriers could achieve certain operational goals prior to passing inside (or while remaining outside) the range of certain Chinese maritime anti-access

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<sup>14</sup>The phrase "other maritime-relevant military forces" is used here to refer to Chinese military forces outside China's navy that can be used to counter U.S. naval forces operating in the Western Pacific. Land-based air force aircraft armed with anti-ship cruise missiles (ASCMs) and potential land-based anti-ship ballistic missiles (ASBMs) are examples of such forces.

<sup>15</sup>CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities — Background and Issues for Congress*, by Ronald O'Rourke.

systems, such as potential Chinese anti-ship ballistic missiles (ASBMs). Cruisers and destroyers would have substantial capabilities for conducting ASW, AAW, BMD, and strike operations, particularly in blue water (mid-ocean) areas. The BMD systems on these ships might be highly capable, so as to counter potential Chinese ASBMs.

U.S. Navy operations to counter improved Chinese naval and other maritime-relevant military forces would likely have a more purely maritime character than U.S. Navy operations in conventional conflicts on the continental land mass. Compared to placing a strong planning emphasis on conflicts on the continental land mass, placing a strong planning emphasis on countering improved Chinese naval and other maritime-relevant military forces might lead to a future Navy with more attack submarines, fewer amphibious ships, a greater percentage of its high-capability combatants assigned to the Pacific Fleet, and perhaps a greater percentage of Pacific Fleet ships homeported in forward locations such as Japan, Guam, and Hawaii. Having strong features for ensuring computer network security and for withstanding electromagnetic pulse (EMP) and other nuclear-weapon effects might be more of a planning concern than under the third category of operations.

Opponents of placing a strong planning emphasis on operations to counter improved Chinese naval and other maritime-relevant military forces might argue that preparing for a potential conflict over Taiwan years from now might be unnecessary, since the situation with Taiwan might well be resolved by then. They could also argue that it is highly unlikely that China and the United States will come to blows in coming years over some other issue, due to the deep economic and financial ties between China and the United States and the tremendous damage such conflict could inflict. Far from coming to blows, they could argue, Chinese and U.S. naval forces in coming years may cooperate in areas such as HA/DR operations, anti-piracy operations, and other maritime-security operations.

Supporters of placing a strong planning emphasis on operations to counter improved Chinese naval and other maritime-relevant military forces might argue that not preparing for a potential conflict over Taiwan years from now could make such a conflict more likely by emboldening China to use military force to attempt to achieve its goals regarding Taiwan. They could argue that not preparing to counter improved Chinese naval forces might embolden China to use its naval forces more aggressively in asserting its maritime territorial claims and its interpretation of international laws relating freedom of navigation in exclusive economic zones (an interpretation at odds with the U.S. interpretation). Supporters could argue that even if China and the United States never come to blows with one another, maintaining a day-to-day presence in the Pacific of U.S. naval forces capable of successfully countering Chinese naval forces will be an important U.S. tool for shaping the region — that is, for ensuring that other countries in the region do not view China as the region's emerging military leader (or the United States as a fading military power in the region), and respond by either aligning their policies more closely with China or taking steps to improve their own military capabilities that the United State might prefer they not take, such as developing nuclear weapons.

## Some Additional Planning Considerations

Below are brief discussions of some additional planning considerations regarding the future Navy. The list of considerations discussed here is not comprehensive, and the items are not presented in any particular order.

### Presence As a Force-Planning Metric

The United States for several decades has maintained continuous or near-continuous forward deployments of U.S. naval forces in certain overseas areas considered important to U.S. security, including the Mediterranean Sea, the Indian Ocean and Persian Gulf, and the Western Pacific. In the past, forward-deployed naval forces have been used for various purposes, including deterring potential aggressors, reassuring allied and neutral states, conducting engagement and coalition-building operations, gaining familiarity with potential wartime operating areas, conducting surveillance and intelligence operations, and responding rapidly to crises and other contingencies. In coming years, maintaining continuous, near-continuous, or frequent forward deployments of U.S. naval forces to overseas operating areas could be helpful, important, or even critical to conducting operations in all four of the categories discussed earlier.

As explained in a CRS report issued at the start of the post-Cold War era, maintaining a capability for supporting continuous, near-continuous, or frequent forward deployments of naval forces can be a significant Navy force-planning metric, particularly because the number of ships needed to maintain a desired level of forward-deployed presence in some cases can be greater than the number needed to conduct combat operations.<sup>16</sup> Maintaining higher levels of forward-deployed naval forces is facilitated by having larger numbers of ships, by forward-homeporting ships in or near key overseas operating areas, and by operating ships with multiple crews.

### Comparative Numbers of Ships and Aggregate Ship Tonnages

Comparisons of the number of ships in the Navy to the numbers of ships in other navies, and similar comparisons of the aggregate tonnage of the U.S. Navy to the aggregate tonnages of other navies, are at best only partial metrics for understanding requirements for U.S. naval forces, and at worst can be highly misleading metrics. A navy's number of ships and aggregate tonnage are only partial indications of its capabilities. Other important factors contributing to a navy's capabilities include the types of ships in question; types and numbers of aircraft; the sophistication of sensors, weapons, C4ISR systems, and networking capabilities; supporting maintenance and logistics capabilities; doctrine and tactics; and the quality, education, and training of personnel. Given these other significant contributors to naval capability, navies with similar numbers of ships or similar aggregate tonnages can have significantly different capabilities, and navy-to-navy ratios of numbers of ships or aggregate tonnages might provide a

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<sup>16</sup>CRS Report 92-803 F, *Naval Forward Deployments and the Size of the Navy*, by Ronald O'Rourke. (November 13, 1992) 56 pp. Out of print and available directly from the author.

highly inaccurate sense of their relative capabilities. Such comparisons also do not take into account maritime-relevant capabilities that countries might have outside their navies, such as land-based anti-ship cruise missiles (ASCMs), land-based theater-range ballistic missiles, and land-based air force aircraft armed with ASCMs.

More important, focusing on relative ship numbers and aggregate fleet tonnages can reflect or reinforce the notion that the navies exists primarily or exclusively to fight other navies. As explained in a CRS report issued at the start of the post-Cold War era, this notion is an oversimplification, particularly for the U.S. Navy.<sup>17</sup> U.S. Navy forces conduct various missions that may or may not require countering the land-based and/or sea-based forces of other countries. Countering foreign naval forces is only part of this situation, and in many cases not the most important part. Countries have differing needs for naval forces, and the mission requirements for one country's navy can differ significantly from the mission requirements for another country's navy. Consequently, the adequacies of navies are best judged against their respective missions, not in terms of how they might compare to other navies. Even if other countries had no naval capabilities, the United States might still require significant naval capabilities to defend U.S. interests. When cited in isolation from other considerations, comparisons of relative ship numbers and aggregate fleet tonnages do not really prove anything one way or another about the adequacy of current or potential future U.S. naval forces.

## Regionally Tailored Naval Capabilities

Some kinds of naval operations are more likely to be conducted in certain parts of the world than others. Anti-piracy operations are one example; operations to counter improved Chinese naval forces are another. An assessment that certain kinds of operations are more likely to be conducted in some regions than others, combined with constraints on resources, could lead to a future Navy featuring a greater use than at present of regionally tailored naval capabilities.

## Hybrid War

A growing number of observers believe that wars in the future are likely to be hybrid wars, meaning wars in which state or non-state adversaries merge or blend all forms of war and tactics, including conventional warfare, insurgency, terrorism, and criminal activity.<sup>18</sup> The Navy-Marine Corps-Coast Guard strategy document released in October 2007 states: "Conflicts are increasingly characterized by a hybrid blend of traditional and irregular tactics, decentralized planning and execution, and non-state actors using both simple and sophisticated technologies in

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<sup>17</sup>CRS Report 93-332 F, *Naval Force-Structure Planning: Breaking Old Habits of Thought*, by Ronald O'Rourke. (March 19, 1993) 6 pp. Out of print and available directly from the author. See also the section entitled "Overall Number of Ships" in Appendix C of CRS Report RL32665, *Navy Force Structure and Shipbuilding Plans: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>18</sup>See, for example, Frank G. Hoffman, *Conflict in the 21<sup>st</sup> Century[:] The Rise of Hybrid Wars*. Arlington (VA), Potomac Institute for Policy Studies, December 2007. 72 pp.

innovative ways.”<sup>19</sup> In testimony to this subcommittee last July, Navy officials noted the Hezbollah organization’s use of a Chinese-made ASCM against an Israeli frigate in 2006. Hybrid war blurs the distinctions between the four categories of operations discussed earlier, and could require the acquisition of capabilities associated earlier with one category to support a planning emphasis on conducting operations in another.

## Unmanned Vehicles

Although there is general agreement that the Navy will make increasing use of unmanned vehicles (UVs) in coming years, the numbers and designs of these vehicles, their parent platforms, and their concepts of operations are not yet clear. As a consequence, the effect of UVs on future Navy force architecture is uncertain. UVs could effectively extend the eyes and ears of Navy ships and submarines, but whether that would lead to an increase in the planned numbers of certain ships or submarines (because those ships or submarines could now perform a greater variety of missions) or to a decrease in planned numbers (because a smaller number of those ships or submarines might now be needed to perform a given set of missions) is unclear. Ship designs will change to accommodate UVs, but the ultimate extent of those changes is unclear.

## More Highly Distributed Force Architectures

Some observers believe that advances by potential adversaries in capabilities for detecting, tracking, and attacking large ships, combined with U.S. advances in UVs, distributed sensors, and networking technology, argue in favor of working toward a future Navy with a more highly distributed force architecture that would feature fewer large ships and larger numbers of smaller ships. The LCS program might be viewed as a step in this direction. Implementing the idea more comprehensively could lead to a significant change in the mix of ships to be procured: Planned procurement quantities of smaller ships would likely be increased, new designs for smaller ships might be created, and planned procurement quantities for larger ships could be reduced.

## India

India’s naval capabilities have improved in recent years, and could improve further in coming years. India may use its navy to politically counter potentially growing numbers of Chinese naval forces operating in the Indian Ocean.<sup>20</sup> Other things held equal, Indian operations of this kind might lessen U.S. Navy requirements for countering Chinese naval forces in the Indian Ocean, particularly in a context of U.S.-Indian cooperation on security issues. On the other hand, Indian operations of this kind might contribute to an Indian-Chinese naval competition in the Indian

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<sup>19</sup>A *Cooperative Strategy for 21st Century Seapower*, October 2007, p. 3

<sup>20</sup>Some observers believe China in coming years may deploy increasing numbers of naval forces to the Indian Ocean for purposes such as naval diplomacy and defending China’s sea lines of communication to Persian Gulf oil sources.



Ocean. If such a competition were to occur, and if U.S. officials wished to preserve an independent U.S. capability to counter Chinese naval forces operating in the Indian Ocean, then U.S. Navy requirements for countering Chinese naval forces in the region could increase.

## Russia

The end of the Cold War and the subsequent collapse of Russian naval capabilities significantly downgraded the Russian navy as a force-sizing factor in U.S. Navy planning. Russia's naval technology, however, has remained a benchmark for defining the required capabilities of U.S. Navy platforms, sensors, and weapons, particularly since some of that technology has been exported to other countries, including China. Russia has exported, among other things, submarines, surface combatants, naval aircraft, ASCMs, torpedoes, and mines. Such exports improve the fielded capabilities and raise the technological baselines of the recipient navies, which in turn can influence requirements for U.S. naval forces.

Russian officials have announced an intent to rebuild the Russian navy. The pace at which such a buildup might proceed could depend in part on the future price of oil, since oil exports are a major source of Russian government funds. A buildup of Russian naval capability could at some point increase the importance of the Russian as a force-sizing factor in U.S. Navy planning. In addition, the legal status of the Northern Sea Route through the Arctic (see below) is an issue that could lead to a U.S.-Russian dispute with a strong maritime component.

## Arctic

The diminishment of Arctic ice could lead in coming years to increased U.S. Navy (and Coast Guard) surface ship operations the Arctic for performing such missions as defending the U.S. position on the legal status of the Northern Sea Route (NSR) and the Northwest Passage (NWP).<sup>21</sup> Increased Navy surface ship and aircraft operations in the Arctic could, other things held equal, increase numerical requirements for those platforms. It could also affect ship and aircraft design requirements and requirements for Arctic bases, logistics capabilities, and communications and navigation systems.

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<sup>21</sup>The NSR and NWP are Arctic sea routes connecting the Atlantic and Pacific Oceans that could permit commercial ships serving certain ports to reduce their steaming distances by several thousand miles. The NSR runs along the northern coast of Russia, while the NWP runs along the northern coast of Alaska, the northern coast of Canada, and through the Canadian archipelago. Russia and Canada, respectively, claim sovereignty over parts of the NSR and NWP, while the United States and the European Union countries insist that they are international straits.

# Some Specific Shipbuilding Issues

Below are discussions of some specific shipbuilding issues relating to the future Navy.

## Aircraft Carriers (and Carrier Air Wings)

There currently is discussion in defense-planning circles of the option of reducing the number of CVNs to something less than 11. Possibilities include 10, nine, and eight (the last being the number proposed in CNAS report discussed earlier). As previously mentioned, the Navy reportedly is considering the option of stretching out CVN procurement to one ship every five years. Such a rate would be consistent over the long run with operating a force of 10 carriers, though the force might not drop to 10 until many years from now.

Supporters of reducing the number of CVNs to something less than 11 would cite their views regarding future missions to be performed by the Navy, as well as other arguments, including one or more of the following:

- the growing number of targets per day that can be attacked by a carrier air wing, which could permit certain combat missions to be carried out in the future by a smaller number of carriers than is possible today;
- advancements by other countries in capabilities for detecting, tracking, and attacking aircraft carriers, which increase combat threats to carriers, and the cost of defending against those threats;
- a projected shortfall in carrier-based strike-fighters;<sup>22</sup> and
- the potential for supplementing a force of fewer than 11 CVNs with smaller aircraft carriers.

In connection with the last point above, it can be noted that the provision requiring the Navy to maintain a force of 11 operational aircraft carriers (10 USC 5062(b)) does not set a minimum size requirement for what qualifies as an aircraft carrier for purposes of the provision, leaving open the possibility that ships smaller than today's 100,000-ton carriers could contribute to meeting the requirement. As discussed in a 2006 CRS report, there are several additional options for smaller carriers, including a medium-sized (roughly 45,000-ton) carrier based on the design of a large-deck amphibious assault ship (LHA/LHD).<sup>23</sup>

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<sup>22</sup>For more on this projected shortfall, see CRS Report RS22875, *Navy-Marine Corps Strike-Fighter Shortfall: Background and Options for Congress*, by Christopher Bolcom.

<sup>23</sup>CRS Report 32914, *Navy Ship Acquisition: Options for Lower-Cost Ship Designs - Issues for Congress*, by Ronald O'Rourke.

Opponents of reducing the number of CVNs to something less than 11 would cite their views regarding future missions to be performed by the Navy, as well as other arguments, including one or more of the following:

- the effect that such a reduction would have on the Navy's ability to maintain forward-deployments of carriers for purposes such as deterrence, reassurance, and rapidly responding to crises and conflicts;
- actual or potential U.S. difficulties in gaining or maintaining access to overseas air bases;
- proposals for closing the projected strike-fighter shortfall through procurement of additional strike-fighters; and
- the more-limited capabilities of the smaller air wings that would be embarked on smaller carriers.

Opponents might also argue that a shortage of carrier-based strike-fighters (or other carrier-based aircraft) is not necessarily a compelling reason to reduce the number of CVNs, because such a situation could be a way to hedge against relatively rapid changes in the defense-planning environment: If change in the defense-planning environment required the Navy to increase its carrier-based aviation capabilities over a period of a few years, it could be argued, there would be enough time to produce additional carrier-based aircraft, but not be enough time to build an additional CVN.

In addition to having significant implications for future Navy capabilities, reducing the number of CVNs to something less than 11 could have implications for the CVN industrial base. Stretching out CVN procurement to one ship every five years, for example, could reduce efficiencies in building CVNs, making the ships more expensive to procure.

If the CVN force is reduced to eight ships, one option would be to suspend CVN procurement after CVN-78 or CVN-79 for a period of more than 20 years, until a replacement is needed for one of the eight ships. Such a long break in the CVN production profile could lead to a significant atrophy (or the disappearance) of skills and capabilities for building CVNs. The costs and technical risks of reestablishing these skills and capabilities and restarting CVN production after a such long hiatus could be very significant.

An alternative profile for an eight-CVN force would be to stretch out CVN production to one ship every six years. This could reduce efficiencies in building CVNs even more than moving to a profile of one carrier every five years. Additional alternatives for an eight-CVN force include procuring one CVN every five years and reducing CVN service life from the current 50 years to 40 years, procuring one CVN every 4.5 years and reducing CVN service life to 36 years, and procuring one CVN every 4 years and reducing CVN service life to 32 years.<sup>24</sup>

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<sup>24</sup>For more on aircraft carrier procurement, see CRS Report RS20643, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke. The more that CVN service life is reduced, the more possible it might become, with continued improvements in U.S. Navy fuel core (continued...)

A reduction in the number of CVNs to something less than 11 would also have implications for CVN homeporting arrangements: There would be fewer CVNs to homeport, and the reduced number of CVNs might make it more necessary to forward-homeport an additional CVN in the Mediterranean, the Indian Ocean, or the Western Pacific as a means of maintaining a certain number of CVNs forward deployed in overseas operating areas.<sup>25</sup>

One issue regarding planning for carrier air wings is whether to increase planned procurement of strike-fighters in coming years so as to mitigate the projected strike-fighter shortfall, and how this issue might be affected by a decision to reduce the number of carriers and, with it, the number of carrier air wings. A related issue concerns the mix of F/A-18 Super Hornets and Navy/Marine Corps F-35B and C Joint Strike Fighters (JSFs) to be procured in coming years. Advocates of Super Hornets might argue that they are capable aircraft, and that they are less expensive to procure than the F-35 Bs and Cs and can therefore be procured in greater numbers for a given amount of procurement funding. Advocates of F-35Bs and Cs could argue that they make greater use of advanced technology than does the Super Hornet and consequently are more capable, which could improve effectiveness for conducting certain operations, such as countering high-capability enemy aircraft.<sup>26</sup>

An additional issue regarding planning for carrier air wings concerns the Navy Unmanned Combat Air System (N-UCAS). In connection with the idea of operating effectively outside the range of potential Chinese ASBMs and other Chinese maritime anti-access systems, CSBA has proposed an expansion of the demonstrator portion of this program.<sup>27</sup>

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<sup>24</sup>(...continued)

technology, to build CVNs with nuclear fuel cores sufficient to power the ships over their entire service lives. Navy SSNs, which have 33-year service lives, have been built with life-of-the-ship cores for several years now, and the Navy hopes to build the next-generation ballistic missile submarine (SSBN), which might have a service life of 40 or more years, with a life-of-the-ship core. A CVN reactor produces much power than does a submarine reactor, making it less clear whether fuel core technology could improve to the point where life-of-the-ship CVN fuel cores would be possible. But if a reduction in CVN service life made it possible to build CVNs with life-of-the-ship cores, the ships would not require mid-life nuclear refuelings, which could reduce their life-cycle operating and support (O&S) costs. (The ships might still require other mid-life overhaul work.) Other things held equal, the avoidance of a mid-life nuclear refueling, combined with the increased production efficiencies of procuring CVNs every 4, 4.5, or 5 years, rather than at longer intervals, could improve the cost-competitiveness of options for procuring CVNs more frequently and operating them over shorter service lives relative to options for procuring CVNs less frequently and operating them over longer service lives.

<sup>25</sup>For a discussion of one issue relating to CVN homeporting, see CRS Report R40248, *Navy Nuclear Aircraft Carrier (CVN) Homeporting at Mayport: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>26</sup>Additional options that have been mentioned from time to time include terminating procurement of Navy F-35Cs and instead continuing to procure Super Hornets for the Navy until the advent of a so-called 6th-generation carrier-based strike fighter at some point in the future, and terminating procurement of VSTOL F-35Bs for the Marine Corps and procuring the F-35Cs for the Marine Corps instead.

<sup>27</sup>See, for example, Thomas P. Ehrhard and Robert O. Work, *The Unmanned Combat Air System Carrier Demonstration Program: A New Dawn For Naval Aviation?* Washington, Center for Strategic and Budgetary Assessments, May 10, 2007. 39 pp.

## Submarines

As mentioned earlier, the Navy reportedly is considering reducing planned procurement of Virginia-class and follow-on SSNs over 30 years from 53 boats to 40 boats. This proposal, if implemented, could result in an SSN force that eventually declines to the low- to mid-40s and stays there indefinitely. This profile raises a question as to whether consideration is being given to reducing the attack submarine force-level goal from the current figure of 48 to a figure in the low- to mid-40s.<sup>28</sup> Additional questions concerning submarines in the future Navy include but are not limited to the following:

- If additional Ohio-class ballistic missile submarines (SSBNs) are released from their strategic nuclear deterrent role due to changes in nuclear force posture, should they be converted into cruise missile/special operations forces submarines (SSGNs)?
- Should more emphasis be placed on developing UAVs for SSNs and SSGNs, so as to give these submarines a capacity for overhead and deep-inland observation that they currently lack?
- What additional design changes should be incorporated into Virginia-class submarines procured in coming years?
- Are there any recent technical or other developments that would materially change arguments that have been made over the years by supporters and opponents of building non-nuclear-powered attack submarines as supplements to the Navy's SSNs and SSGNs?
- What should be the design features of the next-generation SSBN?

## Cruisers

Procurement of the lead CG(X) cruiser, which was scheduled for FY2011 under the FY2009 shipbuilding plan, is widely expected to slip several years, most likely to FY2017. In addition, as mentioned earlier, the Navy reportedly is considering reducing planned procurement of CG(X)s from 19 (procured at a rate of one or two per year) to eight (procured at a rate of one every three years).<sup>29</sup>

A procurement profile of one ship every three years suggests that the Navy might propose the CG(X) as a highly capable, nuclear-powered ship with a displacement in the range of 20,000 tons. The Navy reportedly has studied such a design option for the CG(X), and the relatively

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<sup>28</sup>For more on attack submarine procurement, see CRS Report RL32418, *Navy Attack Submarine Procurement: Background and Issues for Congress*, by Ronald O'Rourke.

<sup>29</sup>For more on the CG(X) program, see CRS Report RL34179, *Navy CG(X) Cruiser Program: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

high procurement cost of such a ship would be a reason for the Navy to propose stretching out the procurement of the class to one ship every three years.

At a procurement rate of one ship every three years, the eight ships would be procured over a total of 22 years — a period during which Navy priorities could easily shift in response to changes in the international security environment. A procurement rate of one ship every three years might also lead to only modest learning-curve benefits in the program, which could make follow-on ships in the program more expensive than they would be if they were procured more closely together. The profile would also result in the final ship in the class entering service around 2044, potentially decades after the appearance of the threats that the ship might be intended to encounter. For these reasons, one potential question to consider is whether an eight-ship CG(X) program of one ship every three years would be pursued to completion.

The Navy reportedly is considering continuing procurement of the Future Surface Combatant (see next section) into the 2020s. This creates a possibility that if the CG(X) program were terminated in its earlier years for some reason, the FSC could evolve over time into a substitute for the CG(X).

## Destroyers

OSD in July 2008 permitted the Navy to share with Congress the Navy's proposal for halting procurement of DDG-1000s and restarting procurement of DDG-51s, but reserved judgment on the Navy's proposal, stating that more analysis was needed. In the meantime, OSD instructed the Navy to support the request in the proposed FY2009 budget for procurement funding for a third DDG-1000.

Congress in FY2009 provided about 60% of the requested funds for a third DDG-1000, leaving the remaining 40% or so to be provided in FY2010. Congress rejected the Navy's request for \$51 million in FY2009 advance procurement funds for a fourth DDG-1000, and instead provided \$200 million in FY2009 advance procurement funding to preserve the option to restart the DDG-51 program.

On January 26, 2009, John Young, the DOD acquisition executive, issued a memorandum recommending procurement of three DDG-51s in FY2011 and FY2012, followed by procurement in FY2012 and subsequent years of a ship called the Future Surface Combatant (FSC) that would be based on either the DDG-1000 or DDG-51 design.

The DDG-1000 is a multimission destroyer with a strong emphasis on naval surface fire support (NSFS) and features for operating in littoral waters. A decision to continue procuring the DDG-1000 design could be viewed as consistent with a strong planning emphasis on operations for deterring and participating in larger-scale conventional conflicts on the continental land mass. The ships could also be used for conducting other types of operations.

The DDG-51 is a multimission destroyer with an area-defense capable AAW system originally designed for blue-water operations, a BMD capability, and a hull-mounted sonar system optimized for blue-water operations. A decision to restart procurement of the DDG-51 design could be viewed as consistent with a strong planning emphasis on operations to counter

improved Chinese naval and other maritime-relevant military forces. The ships could also be used for conducting other types of operations.

John Young's January 26 memorandum on destroyer acquisition suggests that the FSC may be equipped with a new radar, but does not state explicitly how else the FSC might differ from the current DDG-1000 design or the current DDG-51 design. The CRS report on destroyer procurement<sup>30</sup> and CRS testimony to this subcommittee last July<sup>31</sup> discuss potential variants of the DDG-1000 and DDG-51 designs that would incorporate changes of various kinds. Some of these changes might be pursued as part of a strategy for evolving the FSC over time into a substitute for the CG(X), should the CG(X) program be terminated in its earlier years for some reason.

A key objective in designing the DDG-1000 was to create a ship that would improve the fleet's NSFS capability by fielding the 155mm Advanced Gun System (AGS). If DDG-1000 procurement is halted, a potential question for Congress is whether the fleet's NSFS should be improved through other means, and if so, whether one of those means would be installing AGSs on other types of ships. As discussed in the CRS report on destroyer procurement, the Navy is currently studying various options for improving the fleet's NSFS capability, including options that do not involve the AGS, such as equipping LCSs with the Non-Line of Sight (NLOS) missile. As discussed the CRS report and CRS testimony to this subcommittee last July, ships other than DDG-1000s on which AGSs might be installed include DDG-51s, particularly those modified to have a lengthened hull (one AGS per ship), a modified version of the LPD-17 hull design (two AGSs per ship), and a modified version of the LHA-6 design (up to four AGSs per ship).

## Navy's Role in BMD

The Navy's roles in national missile defense and missile defense in Europe are unclear. Decisions regarding the Navy's roles in these two areas of missile defense will affect requirements for BMD-capable cruiser and destroyers. Various combinations of ships equipped with BMD radars and/or interceptors) are possible for an expanded sea-based national missile defense capability.<sup>32</sup>

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<sup>30</sup>CRS Report RL32109, *Navy DDG-1000 and DDG-51 Destroyer Programs: Background, Oversight Issues, and Options for Congress*, by Ronald O'Rourke.

<sup>31</sup>Statement of Ronald O'Rourke, Specialist in Naval Affairs, before the House Armed Services Committee Subcommittee on Seapower and Expeditionary Forces hearing on Surface Combatant Warfighting Requirements and Acquisition Strategy, July 31, 2008.

<sup>32</sup>For more on sea-based missile defense, see CRS Report RL33745, *Sea-Based Ballistic Missile Defense — Background and Issues for Congress*, by Ronald O'Rourke.

## Lasers

An additional question regarding future cruisers and destroyers is whether they could be equipped with lasers for use against small boats and for AAW or BMD operations. Advances in laser technology, such as those that have been recently reported for solid-state lasers,<sup>33</sup> raise the possibility that lasers for performing such missions might become feasible within the time frame of ships such as the CG(X) and an evolved FSC. If such weapons do become feasible, they offer the potential for significantly improving the economics of defending against ASCMs and ASBMs. At present, the marginal costs for an adversary to deploy additional ASCMs and ASBMs might be less than the marginal costs for the Navy to buy additional interceptor missiles and associated launch tubes, particularly since adding launch tubes can require enlarging existing ships, increasing the size of new-construction ships, or building additional ships. If lasers prove feasible and effective in countering ASCMs and/or ASBMs, they could shift this marginal-cost situation in the Navy's favor.

## Smaller Surface Combatants

The Navy has not settled on an acquisition strategy for LCSs to be procured in FY2011 and subsequent years. Points of uncertainty about the acquisition strategy for these ships include whether and when the Navy will neck down to a single LCS design, which shipyards would build the ships, whether the Navy will shift to a common combat system (should both designs remain in production), and the configuration of such a system.

Another question is whether other kinds of smaller surface combatants should be procured to supplement LCSs, particularly for engagement and partnership-building operations, anti-piracy operations, and other maritime-security operations. Navy versions of the Coast Guard's National Security Cutter (NSC), Offshore Patrol Cutter (OPC), or Fast Response Cutter (FRC) are among the options for such ships. The question of whether to procure other kinds of smaller surface combatants as a supplement to LCSs could become particularly pertinent if planning for the future Navy includes a strong emphasis on capabilities for engagement and partnership operations, anti-piracy operations, and other maritime-security operations.

## Surface Combatants With Extensive Growth Margins

One option for reducing shipbuilding costs in the near-term while preserving an option to substantially expand Navy capabilities relatively quickly at a later point (perhaps in response to a change in the international security environment) would be to build surface combatants with extensive growth margins, so that they could be backfitted with significant amounts of additional weapons and sensors. Such ships, as originally built, might appear under-armed for their size. They would reflect the shipbuilding notion that "steel is cheap" — that a ship's steel hull represents a relatively small fraction of the ship's cost, and that increasing hull size does not by

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<sup>33</sup>See, for example, Peter Pae, "Northrop Advance Brings Era Of The Laser Gun Closer," *Los Angeles Times*, March 19, 2009: B2.



itself increase a ship's procurement cost very much. Such ships would also reflect a view that weapons and sensors can be built and installed on an existing ship more quickly than new ship hulls can be built. The Navy pursued a strategy somewhat along these lines with the Spruance (DD-963) class destroyer program.<sup>34</sup>

## Amphibious and Maritime Prepositioning Ships

Questions concerning programs for building amphibious and maritime prepositioning ships include the planned size of the amphibious force; whether the current LPD-17 class amphibious ship design should be used as the basis for the ships to be procured as replacements for the Navy's current LSD-41/49 class amphibious ships; whether future large-deck amphibious assault ships should be built with well decks and/or nuclear power; and the composition of the Navy's planned MPF(F) squadron.

As discussed in detail in a CRS report on the LPD-17 program, the planned size of the amphibious fleet has been a subject of continuing discussion between the Navy and the Marine Corps. Although the Navy's proposed 313-ship fleet includes 31 amphibious ships, Marine Corps officials have maintained that their minimum requirement is 33. The CRS report presents options for amphibious ship fleets with more than 33 ships for meeting certain potential amphibious lift goals.<sup>35</sup>

It was recently reported that there is a growing consensus among Navy and Marine Corps officials that the amphibious ship force-level goal should be increased to 38 ships, though it remains unclear whether such a goal, if adopted, would be fully funded. According to this report, Navy and Marine Corps officials agree that the current LPD-17 class amphibious ship design should be used as the basis for ships to be procured as replacements for the Navy's current LSD-41/49 class amphibious ships. The report stated that the design of future large-deck amphibious assault ships and the composition of the MPF(F) squadron are questions that remain unresolved.<sup>36</sup>

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<sup>34</sup>The Spruance-class destroyer design originally included an area-defense AAW system. To reduce the design's estimated procurement cost, the ship's AAW capability was changed to a less expensive point-defense AAW system. Years later, the space originally reserved for the ship's area-defense missile launcher and magazine was used to accommodate the backfit of a 61-cell vertical launch system (VLS) cell, which gave these ships a significant Tomahawk strike capability. The backfit was made to 24 of the 31 ships in the class.

<sup>35</sup>CRS Report RL34476, *Navy LPD-17 Amphibious Ship Procurement: Background, Issues, and Options for Congress*, by Ronald O'Rourke.

<sup>36</sup>Zachary M. Peterson, "Navy, Marine Corps Agree 38-Vessel Amphibious Fleet Necessary," *Inside the Navy*, March 16, 2009.

## Nuclear-Powered Surface Ships Other Than Aircraft Carriers

The issue of using nuclear power in the future for surface ships other than aircraft carriers is discussed in detail in a CRS report.<sup>37</sup> The FSC proposed in John Young's January 26 memo on destroyer procurement would likely be a conventionally powered ship, since it would be based on either the DDG-1000 or DDG-51 designs, both of which are conventionally powered.

Consequently, aside from the CG(X), the next opportunity for procuring a nuclear-powered surface ship other than an aircraft carrier might be a large-deck amphibious assault ship scheduled for procurement a few years from now.

Mr. Chairman, distinguished members of the subcommittee, this concludes my testimony. Thank you again for the opportunity to appear before you to discuss these issues. I will be pleased to respond to any questions you might have.

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<sup>37</sup>CRS Report RL33946, *Navy Nuclear-Powered Surface Ships: Background, Issues, and Options for Congress*, by Ronald O'Rourke.